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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/725,092

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Selim Shlomo Rakib

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EXAMINER

MEW, KEVIN D

ART UNIT

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2616

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/725,092	<b>Applicant(s)</b> RAKIB ET AL.	
	<b>Examiner</b> Kevin Mew	<b>Art Unit</b> 2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-18 is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☒ Claim(s) 2-4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 October 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/16/07</u> .  | 6) <input type="checkbox"/> Other: _____                          |

***Detailed Action***

***Specification***

1. The specification is objected to because of the following informalities:  
  
On page 7, line 1, the word "Emb diments" should be replaced "Embodiments."  
  
On page 10, lines 19-20, please remove the underlining.  
  
Appropriate correction is required.

***Claim Objections***

2. Claims 9, 13 are objected to because of the following informalities:  
  
In lines 6-11, claim 9, the preamble of the claim "A process implemented ... through a plurality of optical nodes and an upstream mapper" is repeating. Please delete the redundant preamble in lines 6-11.  
  
In line 19, claim 13, replace the word "determing" with "determining."  
  
Appropriate corrections are required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Graham Mobley et al. (US Publication 2003/0053493 A1).

Regarding claim 1, Graham Mobley discloses a subsystem for a cable modem termination apparatus to allow flexible upstream and downstream mapping, comprising:

a downstream mapper (downstream O/E interface 417, paragraphs 0119, 0120 and Fig. 4) having one or more inputs for coupling to DOCSIS downstream transmitters (one input for coupling to the DOCSIS data equipment 403 at the service provider, paragraph 0119, Fig. 4), and one or more outputs for coupling to hybrid fiber coaxial cable systems (one output to network 105, which is a HFC network, paragraph 0120, Fig. 1), and having a control input (combiner 415 and splitter 416, Fig. 4);

an upstream mapper (upstream O/E interface 418, paragraphs 0119, 0120, Fig. 4) having one or more inputs for coupling to hybrid fiber coaxial cable systems (having input to the HFC network, paragraph 0120, Fig. 4) and having one or more outputs for coupling to inputs of one or more DOCSIS upstream receivers (one input for coupling to the DOCSIS data equipment 413 at the customer, paragraph 0119, Fig. 4), and having a control input (splitter and combiner 422, Fig. 4);

control circuit (O/E interface 420, Fig. 4, paragraph 0031) coupled to said control inputs (coupled to combiner 415 and splitter 416, Fig. 4) for generating signals which control which transmitters are coupled to which optical nodes (generating electrical signals which are associated with customers) and which optical nodes are coupled to which receivers (generating optical signals which are associated with customers, paragraph 0120, Fig. 4).

***Allowable Subject Matter***

4. Claims 5-18 allowed.
5. Claims 2-4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

In claim 2, the apparatus of claim 1 wherein said control circuit is a computer programmed with at least one upstream media access control process (UMAC) and a downstream media access control process (DMAC) for each DOCSIS downstream generated by one of said transmitters, and wherein said computer is programmed by said UMAC and DMAC processes to exchange data between said UMAC process and said DMAC processes to allow a flexible number of downstreams share the same upstream receiver.

In claim 3, the apparatus of claim 1 further comprising a cable modem termination system comprising:

wherein each said receiver is a separate line card which has a computer therein programmed with an upstream media access control process (UMAC); and

each said transmitter is a separate line card having a computer therein programmed to execute a downstream media access control process (DMAC) for a DOCSIS downstream generated by said transmitter; and

wherein at least one of said receivers represents a shared upstream receiver shared by a plurality of downstreams; and

wherein said computers in said line cards are programmed by said UMAC process of said shared upstream receiver and said DMAC processes of said transmitters which share said shared upstream receiver to exchange data between said UMAC process and said DMAC processes via said packet switch to allow a flexible number of downstreams to share the same upstream receiver.

In claim 5, a subsystem for a cable modem termination apparatus to allow flexible upstream and downstream mapping, comprising:

having a control input, for flexibly mapping signal paths from said one or more optical nodes to one or more radio frequency inputs of said one or more DOCSIS upstream receivers in accordance with switching control signals received at said control input; and

one or more computer means coupled to said control inputs of said downstream mapper means and said upstream mapper means, said computer means for generating said switching control signals for each of said downstream and

upstream mapper means to implement a desired mapping of DOCSIS downstreams generated by said transmitters to said optical nodes and a desired mapping of signals from said one or more optical nodes to the radio frequency inputs of said one or more DOCSIS upstream receivers and to be able to alter said mappings easily by changing said switching control signals.

In claim 9, a process implemented by a cable modem termination system having a plurality of downstream transmitter line cards and a one or more upstream receiver line cards, said downstream transmitter line cards coupled to a plurality of cable modems through a plurality of optical nodes and a downstream mapper, said upstream receiver line cards, said upstream receiver line cards coupled to a plurality of cable modems through a plurality of optical nodes and an upstream mapper, comprising:

5) conducting DOCSIS ranging with said cable modems and using information in said ranging bursts to build a routing table;

6) carrying out load balance monitoring so as to create new upstreams and/or downstreams with channel parameters and burst profiles as needed to meet load balancing considerations; and

7) generating and sending suitable switch control commands to said upstream and/or downstream mappers as needed to change said upstream and/or downstream mappings between receivers and said optical nodes and between transmitters and said optical nodes as needed to meet said load balancing considerations, and generating and sending suitable DOCSIS downstream messages to cause selected

cable modems to switch to said new upstreams and/or downstreams as needed and to alter which downstream share an upstream so to meet said load balancing considerations.

In claim 13, a process carried out in a cable modem termination system (CMTS), comprising the steps:

7) using said channel parameter and burst parameter data received from said UMAC process for said shared upstream in each of the DMAC processes for downstreams mapped to share said upstream to generate and send on each downstream mapped to said said upstream upstream channel descriptor messages describing channel and burst parameters of said shared upstream;

10) processing in said UMAC and said upstream receiver line card representing said shared upstream initial ranging bursts from said cable modems tuned to said downstream group, said processing carried out in conventional DOCSIS fashion to make timing, frequency and power offset measurements and develop upstream equalization coefficients for each cable modem;

11) sending said offset measurements and upstream equalization coefficients for each cable modem to the DMAC process for the downstream to which said cable modem is tuned, and using said data in said DMAC process to send a ranging response message to said cable modem to cause it to adjust its timing, frequency and power and upstream equalization coefficients for subsequent upstream transmissions;



12) using data in said initial ranging bursts to build a routing table which indicates which cable modems are tuned to each downstream in said downstream group;

13) determining which cable modems still need to do more ranging, and generating in said UMAC process MAP data defining intervals during which each such cable modem may transmit additional ranging bursts and sending said MAP data to a DMAC process for a downstream to which said cable modem is tuned;

14) completing DOCSIS ranging using invited ranging bursts and registering each cable modem which has successfully completed ranging;

15) receiving upstream bandwidth requests from cable modems which have registered;

16) UMAC of shared upstream processes upstream bandwidth requests so as to grant synchronous code division multiple access (SCDMA) bursts from cable modems coupled to the same optical node so as to be grouped together during the same time interval, and so as to coordinate grants for time division multiple access (TDMA) bursts from cable modems coupled to different optical nodes coupled to said shared upstream receiver line card so that there will be no overlap in time upon arrival of said time division multiple access bursts at said receiver, and generating grant data defining these grants, and sending said grant data to DMAC processes for downstreams to which cable modems having grants are tuned;

17) generating and sending from said DMAC processes which receive grant data in step 16 MAP messages which inform cable modems having grants when they may transmit and what types of bursts they may transmit;

18) determining from said grant data and said routing table when each granted burst is expected to arrive from each cable modem and generating switch control data to control said upstream mapper so as to couple an upstream signal path from each said optical node which receives a downstream in said downstream group to said radio frequency input of said upstream receiver line card only during a time when a TDMA burst is arriving from an optical node or only during an interval when a plurality of SCDMA bursts are arriving from an optical node so as to avoid noise aggregation;

19) monitoring upstream and downstream traffic loads and deciding whether to add another upstream and/or another upstream receiver to the existing shared upstream and/or another downstream and change said upstream and/or downstream mappings; and

20) if a decision is made to add another upstream with its own identification code, suitable channel and burst parameter data is generated to define the new upstream and send to the DMACs in the downstream group, and the DMACs use this data to generate and send UCD messages which define the new upstream and to send upstream channel change messages to cable modems to be switched to said new upstream;

21) generating new switch control commands for said upstream mapper to change the mapping of optical nodes to upstream receiver line cards to implement said new upstream;

22) if a decision is made in step 19 to add another receiver to the existing upstream, generating suitable switch control signals for said upstream mapper to divert selected bursts to said new upstream receiver line card and sending any configuration data needed by said new receiver line card to configure it to receive the type of bursts to be diverted to it;

23) if a decision is made in step 19 to add another downstream, creating a new downstream and sending DOCSIS channel change messages to cable modems to be switched to said new downstream, and generating suitable switch control signals to said downstream mapper to change mapping between said downstream line card transmitters and said optical nodes; and

24) re-initializing any cable modems switched to new downstreams and/or upstream per conventional DOCSIS processing.

In claim 17, a process carried out in a cable modem termination system (CMTS) comprising the steps:

5) conducting DOCSIS ranging and registration with said cable modems and using information in said ranging and/or registration processes to build a routing table;

7) carrying out load balance monitoring so as to determine the need to add new upstream receivers to share the traffic load on said shared upstream or to create new upstreams and/or downstreams with channel parameters and burst profiles as needed to meet load balancing considerations; and

8) generating and sending suitable switch control commands to said upstream as needed to change said upstream mapping of optical nodes to receiver inputs and/or change said downstream mapping of transmitters to optical nodes, and generating and sending DOCSIS messages to move cable modems to new upstreams and/or downstreams as needed to meet said load balancing considerations, and generating and sending suitable DOCSIS downstream messages to change mappings of downstreams to a shared upstream as needed to meet said load balancing considerations.

*Conclusion*

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Mew whose telephone number is 571-272-3141. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on 571-272-3179. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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8/11/08